THE CONSTRUCTION AND USE OF AN IMPROVED SLOW NEUTRON VELOCITY SPECTROMETER

BY

FRANK NEWTON GILLETTE

B.S., Bradley Polytechnic Institute, 1938

AN ABSTRACT OF A THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN PHYSICS IN THE GRADUATE SCHOOL OF THE UNIVERSITY OF ILLINOIS, 1942

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Intermittent bursts of slow neutrons, provided by the Illinois linear accelerator, are detected by an ionization chamber at some distance from the target. Circuits have been developed which sort the resulting pulses according to the associated time of flight from source to detector, and register them upon the appropriate one of ten Cenco impulse counters.

The apparatus has been utilized to measure the slow neutron capture cross section of manganese as a function of neutron velocity. The capture cross section is found to vary inversely with neutron velocity. From the results of the experiment one is unable to confirm the existence of a reported resonance level in the thermal region.

VITA

Frank Newton Gillette was born July 16, 1914 at La Harpe, Illinois. He received his elementary education in various public schools of Illinois, attending high school in Peoria, Illinois. He received the B. S. degree from Bradley Polytechnic Institute in 1938. He has done graduate work in physics at the University of Illinois since 1938. He held a research assistantship during 1938-39 and a fellowship during 1939-40. Since that time he has been a teaching assistant on half-time or three-quarter-time. He is affiliated with Sigma Xi and the American Physical Society.